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Original Article

Comparison of Glasgow Blatchford Score and AIMS65 in Predicting Mortality in Patients with Upper Gastrointestinal Bleeding

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ABSTRACT

Introduction: Upper gastrointestinal bleeding (UGIB) is the most common cause of emergency admission in gastrointestinal disease. UGIB could accompany with adverse events if not treated timely. Different scoring systems have been suggested for diagnosing these patients, In this study we aimed to compare the predictive value of two scoring systems AIMS65 and Glasgow Blatchfors scale (GBS) in patients with UGIB. **Methods:** In this cross-sectional study, 153 patients (71.9% male with mean age of 56.72±21.64 years) with acute UGIB between April 2017 and September 2018 were included. Demographic findings, past medical history, laboratory findings, AMIS65 and GBS score, as well as, need for urgent endoscopy, transfusion and mortality were recorded. Both methods value in predicting the outcomes were measured using ROC curves. **Results and Conclusion:** Urgent endoscopy was performed in 44.4%. The most common finding was peptic ulcer with mostly clean base type. Rebleeding occurred in 15%, need for transfusion was in 44.4% and mortality rate was 5.2%. AIMS65 compared to GBS was superior in predicting mortality (AUC of 0.947 vs. 0.80) but was inferior compared to GBS in predicting need for transfusion (0.849 vs. 0.947). None of the systems could predict the need for urgent endoscopy. AIMS65 with cut off 2 and 0 and GBS with cut off of 12 and 8 could predict mortality and need for transfusion. GBS seems a better system in predicting the need for blood transfusion, while AIMS65 is better system for predicting in-hospital mortality in patients with UGIB.

INTRODUCTION

Upper gastrointestinal bleeding (UGIB) is one of the most commonly diagnosed diseases that are treated by the gastroenterologist. Over the past decades, UGIB management using endoscopic intervention and proton pump inhibitors has led to significant reduction in disease associated morbidity and mortality; however, UGIB continues to be associated with high mortality rates and health care costs (1,2).

UGIB associated mortality varies from 2% to 15%, and rebleeding can occur in 10% to 30% of patients. The optimal identification of high-risk patients can help in determining the appropriate individuals for early endoscopic intervention or intensive treatment in these patients (3). An effective risk assessment for the UGIB is important for determining the treatment plans. Glasgow Blatchford Score (GBS) and Rockall score have been recommended as suitable tools for predicting the need for clinical intervention in patients with non-variance UGIBs (4).

It has been shown that the GBS is superior scoring system in predicting the need for endoscopy, mortality and identification of low risk patients who do not require any kind of intervention (5-8). This scale assess the optimal risk of patients with UGIB with a number of clinical and laboratory variables without the need for early endoscopy. In fact, GBS identifies high-risk individuals in need of urgent endoscopy, transfusion or even surgery to control bleeding (6,9). Therefore, this scale is used to determine high-risk patients who require emergency or low-risk action without the need for aggressive intervention in the emergency department.

Recently, AIMS65 has been introduced for predicting UGIB outcome. AIMS65 is consisted of age>65, serum albumin level, systolic blood pressure, prothrombin time (PTT) (INR) and mental status. The AIMS65 scale is simple risk assessment method that has been shown to predict the rate of in-hospital death, hospitalization, and treatment costs in patients with UGIB (10,11). The AIMS65 = 2 has been reported as the cut-off of predicting mortality (10).

Some studies have suggested that the AIMS65 is equivalent to GBS for predicting the outcome of patients and the risk of mortality (12,13); however, some studies suggested that AIMS65 is not appropriate for the UGIB assessment. We aimed to evaluate the predictive value of AIMS65 and

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GBS in predicting the in-hospital mortality in patients with UGIB.

MATERIALS AND METHODS

In this cross-sectional study, 153 patients with acute UGIB visiting emergency department of Imam Khomeini Hospital, Ardabil Iran between April 2017 and September 2018 were included. All adult patients above 18 years old with acute UGIB symptoms including melena, hematemesis or hematochezia were included. Patients with bleeding related to cancer or after surgery, who did not undergo endoscopy or those with incomplete medical files, were excluded. Ethics committee of Ardabil University of Medical Sciences approved the study protocol (Decision Date: December 31, 2017/Decision No: IR.ARUMS.REC.1396.192). Written informed consent was not obtained due to the retrospective nature of the study.

Demographic findings, medical history and underlying diseases, laboratory findings, vital signs (systolic and diastolic blood pressure, heart rate, and mental status) and duration hospital admission as well as results of endoscopy were recorded.

AIMS65 score and Glasgow Blatchford score (GBS) were calculated for all patients using Medcalc software. AIMS65 includes the following criteria: age over 65, systolic blood pressure (SBP) below 90 mmHg, mental status, INR > 1.5 and albumin below 3 g/dl. The GBS also includes levels of hemoglobin, BUN, SBP, sex, heart rate, melanoma, recent syncope, coexisting liver disease, and history of heart failure.

The need for urgent endoscopy as well as the in-hospital complications including rebleeding, death, failed endoscopy, need for transfusion and duration of hospital stay were recorded for all patients.

Statistical Analysis

All data were analyzed using SPSS22 (version 22; SPSS Inc., Chicago, IL). The results are expressed as Mean ± standard deviation or percentage. Kolmogorov-Smirnov test was used to assess normal distribution of data. Chi square test, Fischer's exact test, independent T-test or Mann-Whitney U test were used to compare data between groups. Receiver operating curves (ROCs) and area under curve (AUC) were defined using Medcalc software. the proper cut-off points was determined and sensitivity and specificity of each score were evaluated. p-values of less than 0.05 were considered statistically significant.

RESULTS

During an 18 months period, 153 patients (with mean age of 56.72±21.64 years) with UGIB were admitted to our hospital. Patients' characteristics are demonstrated in Table 1. Most patients were male. Patients had previous UGIB in 40.5%, NSAIDS were the most common medications used.

Urgent endoscopy was performed in 68 cases (44.4%). Endoscopy results were peptic ulcer in 73 cases (47.7%), duodenal ulcer in 42 cases (27.5%), Mallory Weiss in 12 cases (7.8%), gastroduodenal erosions in 10 cases (6.5%) and esophageal varices in 7 cases (4.6%). In nine patients (5.9%) bleeding cause was miscellaneous. Among peptic and duodenal ulcer, The ulcer was clean base in 66 (57.4%), flat pigmented spot in 31 (20.3%), visible vessel in 8 cases (5.2%), adhesive clot in 7 cases (4.6%) and oozing ulcer in 3 cases (2%).

Patients were admitted for mean of 4.84±2.08 days (range 1-15 days). Mean GBS and AIMS65 scores were 7.64±4.14 and 0.96±0.89, respectively.

In hospital outcome were as follows: rebleeding in 23 patients (15%), need for transfusion in 68 patients (44.4%), failed endoscopy in 5 patients (3.3%), re-endoscopy in 46 patients (30.1%), Embolization and need for surgery

Table 1. Patients' characteristics

	N	Percent
Male gender	110	71.9
Medical history		
Heart disease	54	35.3
Heart failure	22	14.4
Diabetes mellitus	29	19
Liver disease	6	3.9
Pulmonary diseases	18	11.8
Stroke	16	10.5
Previous peptic ulcer	41	26.8
Previous GI bleeding	62	40.5
Medication		
NSAIDS	76	49.7
ASA	43	28.1
Clopidogrel	16	10.5
Oral anticoagulants	16	10.5
Proton pump inhibitor	72	47.1
Presenting sign or symptom		
Hematemesis	90	58.8
Hematochezia	19	12.4
Melena	98	64.1
Recent syncope	5	3.3
Mental status change	18	11.8
Vital signs	Mean	Range
Systolic Blood pressure (mmHg)	109.64	65-150
Diastolic blood pressure (mmHg)	73.72	50-95
Heart rate	87.32	67-130
Laboratory findings		
Serum Albumin (mg/dl)	3.44	2.10-4.90
INR	1.22	1-2.80
Creatinine	1.68	0.50-9.90
Urea	64.29	14-289
eGFR	64.02	5-172
Hemoglobin (mg/dl)	11.13	3.60-16.70
Platelet ($\times 10^3$)	227.24	79-458

each in 5 cases (3.3%). Eight patients (5.2%) died during the hospital stay.

Table 2 demonstrates the AIMS65 and GBS scores between patients with and without mortality, transfusion and urgent endoscopy. Both scales were significantly higher in cases with mortality and receiving transfusion, but there was no significant difference between cases with and without need for urgent endoscopy regarding AIMS65 and GBS scores.

On ROC curves, AIMS65 and GBS were able to predict in-hospital mortality with AUC of 0.947 and 0.80, respectively (p<0.001), with no difference between groups according to Medcalc analysis (p=0.09) (Figure 1a). Both groups could also predict need for transfusion with AUC of 0.849 and 0.947, respectively (p<0.001) (Figure 1b). GBS had better results compared to AIMS65 (p=0.002). However, although both AIMS65 and GBS had comparable AUC (0.585 and 0.569), but none of them were able to predict the need for urgent endoscopy (Figure 1c).

Sensitivity and specificity of the AIMS65>2 in predicting in-hospital mortality was 87.5% and 100%, respectively and for GBS>12 was 62.50% and 92.41%, respectively. AIMS65 had significantly higher sensitivity and specificity. For predicting need for transfusion, the sensitivity and specificity of AIMS65>1 was 100% and 64.71%and for GBS>8 was 88.24% and 88.91%, respectively. GBS had better sensitivity and specificity for predicting need for transfusion. AIMS65>1 and GBS>7 had sensitivity of 35.29% and 63.24% and specificity of 80% and 51.76%, respectively. with changing the AIMS 65 between 1 and 2 or GBS between 8 and 12, the specificity of the test were significantly reduced for evaluated outcomes.

Table 2. AIMS65 and GBS scores between patients with and without mortality, transfusion and urgent endoscopy

		GBS	p-value	AIMS65	p- value
Mortality	Yes	12.50±4.24	0.001	2.87±0.83	<0.001
	No	7.37±3.98		0.85±0.77	
Transfusion	Yes	11.07±2.46	<0.001	1.54±0.65	<0.001
	No	4.89±3.02		0.49±0.78	
Urgent endoscopy	Yes	8.10±4.05	0.21	1.11±0.93	0.052
	No	7.27±4.20		0.83±0.84	

DISCUSSION

In this study, we evaluated the ability of AIMS65 and GBS in predicting different outcomes in patients with UGIB. Most of our patients were male. NSAIDS were the most common risk factor of bleeding, with peptic or duodenal ulcer as the most common cause similar to previous studies (14).

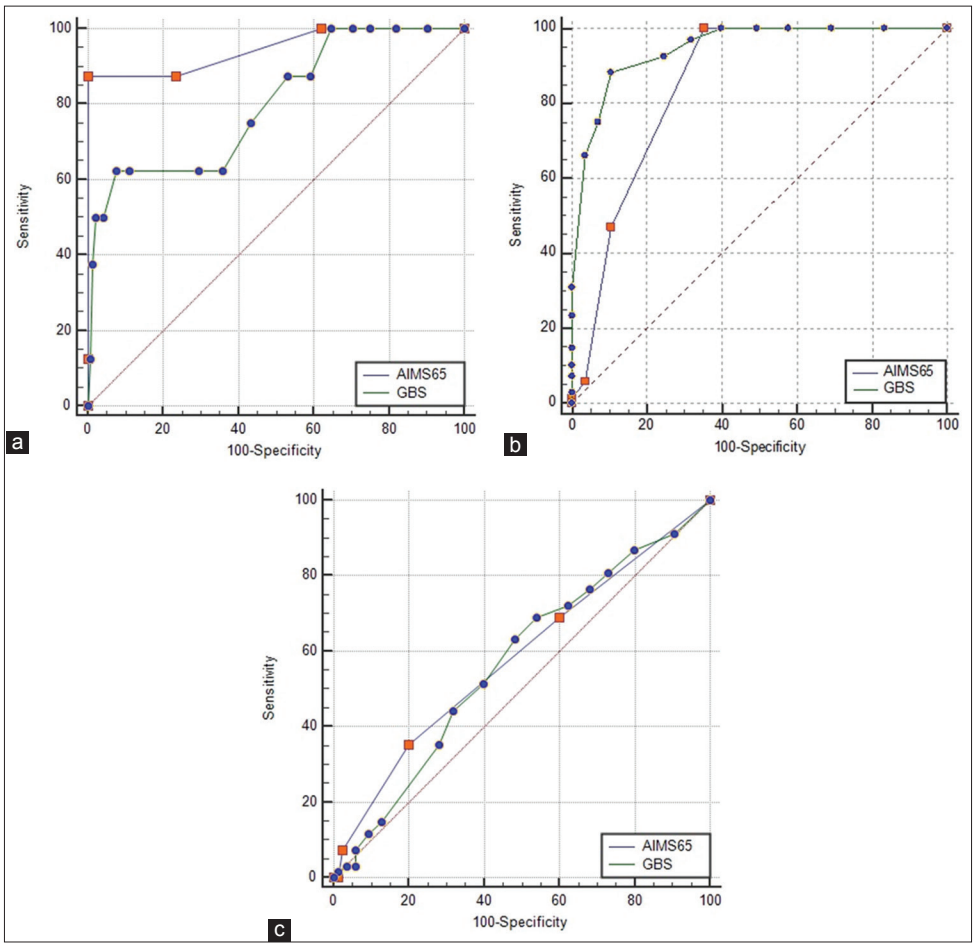

Figure 1. Receiver operating curves for AIMS65 and Glasgow Blatchford score in predicting in-hospital mortality (a), need for transfusion (b) and emergency endoscopy (c)

In the present study, there was no statistically significant difference in AIMS65 and GBS scores between the patients in need of emergency endoscopy in comparison with other patients. Also, using the ROC curve, there was no significant difference between the two scoring methods in predicting the need for emergency endoscopy.

Park et al. (13) found that AIMS65 was more helpful than GBS in predicting the need for emergency endoscopic intervention. However, Choe et al. (3) found that GBS was more effective than AIMS65 in identifying the need for endoscopic intervention.

We also observed that both AIMS65 and GBS was significantly higher in mortality cases. ROC curve analysis showed that both scoring systems have the ability to predict the incidence of death, with the ability of AIMS65 to be greater than GBS, which can be justified with higher sensitivity and specificity.

Hyett et al. (15) observed that AIMS65 was superior to GBS in predicting in-hospital mortality. Gu and colleagues (16) also reported that AIMS65 was the more suitable system compared to GBS in predicting the risk of in-hospital death. Robertson et al. (17) reported similar findings. Unlike these findings, Martınez-Cara and colleagues (12) observed that both AIMS65 and GBS were similar in predicting in-hospital mortality. Tang and colleagues (18) also stated that in patients with acute UGIB in the emergency department, AIMS65 and GBS were clinically more useful than other scoring systems for predicting a 30-day mortality.

AIMS65 is consisted of only five variables and can be easily evaluated, while GBS evaluates multiple variables, so AIMS65 seems to be more effective and easy to use scoring system in predicting mortality after UGIB. The calculation of cut off points for these variables is necessary to determine the appropriate level of significance. However, in previous studies, cut offs reported different outcomes for each scoring system (12,19). It is very difficult to explain the inconsistency in the results and cut off values. However, it can be partly due to some differences in these studies: such as the participants and their race, the cause of bleeding in endoscopy, the use of PPIs, the timing of endoscopy, and the adherence to the guidelines for endoscopic treatment (12).

For example, a study from Spain found that the optimum cut off for prediction of death among UGIB patients was 1 for AIMS65 and 12 for GBS (12). Another study from Australia reported that the appropriate cut off was 3 for AIMS65 and 15 for GBS in prediction of mortality (20). Another study from China suggested that the optimal cut off in predicting mortality among UGIB patients in China was 2 for AIMS65 and 12 for GBS (16). For mortality prediction, the results of our study on patients with UGIB from North-west of Iran was more compatible with the results of study performed in China (16). The appropriate cut off for each scoring system should be assessed separately for different populations in order to increase the ability of identifying patients at risk of bleeding and complications.

In the present study, we also observed that GBS was a better scoring system than AIMS65 for predicting the need for blood transfusion. However, the calculated cut off was one for AIMS65 and eight for GBS. This finding also reflects the difference in the optimal cut off level of scoring systems in predicting different outcomes. Similar to our study, Martínez-Cara and colleagues (12) observed that AIMS65 had lower accuracy compared to GBS in predicting re-bleeding. Park et al. (13) also observed that GBS was more capable of predicting the need for transfusion compared to AIMS65. In another study, Hyett et al. (15) reported that AIMS65 was more efficient in predicting mortality, while GBS was preferable to predict the need for blood transfusions.

This study also has some limitation; A small sample size of patients can be one of the limitations. On the other hand, the cross-sectional study is another limitation of the study.

CONCLUSION

In conclusion, GBS seems a better system in predicting the need for blood transfusion, while AIMS65 is better system for predicting in-hospital mortality in patients with UGIB.

Informed Consent

Written informed consent was obtained from patients who participated in this study.

REFERENCES

1. Cai JX, Saltzman JR. Initial Assessment, Risk Stratification, and Early Management of Acute Nonvariceal Upper Gastrointestinal Hemorrhage. Gastrointest Endosc Clin N Am. 2018;28(3):261-75. doi: 10.1016/j.giec.2018.02.001.
2. Jafar W, Jafar AJN, Sharma A. Upper gastrointestinal haemorrhage: an update. Frontline Gastroenterol. 2016;7(1):32-40. doi: 10.1136/flgastro-2014-100492.
3. Choe JW, Kim SY, Hyun JJ, Jung SW, Jung YK, Koo JS, et al. Is the AIMS 65 Score Useful in Prepdicting Clinical Outcomes in Korean Patients with Variceal and Nonvariceal Upper Gastrointestinal Bleeding? Gut Liver. 2017;11(6):813-20. doi: 10.5009/gnl16607.
4. Beales I. Recent advances in the management of peptic ulcer bleeding. F1000Res. 2017;6:1763. doi: 10.12688/f1000research.11286.1.
5. Bryant RV, Kuo P, Williamson K, Yam C, Schoeman MN, Holloway RH, et al. Performance of the Glasgow-Blatchford score in predicting clinical outcomes and intervention in hospitalized patients with upper GI bleeding. Gastrointest Endosc. 2013;78(4):576-83. doi: 10.1016/j.gie.2013.05.003.
6. Chandra S, Hess EP, Agarwal D, Nestler DM, Montori VM, Song LM, et al. External validation of the Glasgow-Blatchford bleeding score and the Rockall score in the US setting. Am J Emerg Med. 2012;30(5):673-9. doi: 10.1016/j.ajem.2011.03.010.
7. Meltzer AC, Burnett S, Pinchbeck C, Brown AL, Choudhri T, Yadav K, et al. Pre-endoscopic Rockall and Blatchford scores to identify which emergency department patients with suspected gastrointestinal bleed do not endoscopic hemostasis. J Emerg Med. 2013;44(6):1083-7. doi: 10.1016/j.jemermed.2012.11.021.

8. Pang SH, Ching JYL, Lau JIW, Sung JJ, Graham DY, Chan FK. Comparing the Blatchford and pre-endoscopic Rockall score in predicting the need for endoscopic therapy in patients with upper GI hemorrhage. Gastrointest Endosc. 2010;71(7):1134-40. doi: 10.1016/j.gie.2010.01.028.
9. Rickard A, Squire R, Freshwater DA, Smith JE. Validation of the Glasgow Blatchford Score to enable safe discharge of selected patients with upper GI bleeding. J R Nav Med Serv. 2012;98(3):12-4.
10. Park SW, Song YW, Tak DH, Ahn BM, Kang SH, Moon HS, et al. The AIMS65 Score Is a Useful Predictor of Mortality in Patients with Nonvariceal Upper Gastrointestinal Bleeding: Urgent Endoscopy in Patients with High AIMS65 Scores. Clin Endosc. 2015;48(6):522-7. doi: 10.5946/ce.2015.48.6.522.
11. Jung SH, Oh JH, Lee HY, Jeong JW, Go SE, You CR, et al. Is the AIMS65 score useful in predicting outcomes in peptic ulcer bleeding? World J Gastroenterol. 2014;20(7):1846-51. doi: 10.3748/wjg.v20.i7.1846.
12. Martínez-Cara JG, Jiménez-Rosales R, Úbeda-Muñoz M, de Hierro ML, de Teresa J, Redondo-Cerezo E. Comparison of AIMS65, Glasgow–Blatchford score, and Rockall score in a European series of patients with upper gastrointestinal bleeding: performance when predicting in-hospital and delayed mortality. United European Gastroenterol J. 2016;4(3):371-9. doi: 10.1177/2050640615604779.
13. Park SM, Yeum SC, Kim BW, Kim JS, Kim JH, Sim EH, et al. Comparison of AIMS65 Score and Other Scoring Systems for Predicting Clinical Outcomes in Koreans with Nonvariceal Upper Gastrointestinal Bleeding. Gut Liver. 2016;10(4):526-31. doi: 10.5009/gnl15153.
14. van Leerdam ME. Epidemiology of acute upper gastrointestinal bleeding. Best Pract Res Clin Gastroenterol. 2008;22(2):209-24. doi: 10.1016/j.bpg.2007.10.011.
15. Hyett BH, Abougergi MS, Charpentier JP, Kumar NL, Brozovic S, Claggett BL, et al. The AIMS65 score compared with the Glasgow-Blatchford score in predicting outcomes in upper GI bleeding. Gastrointest Endosc. 2013;77(4):551-7. doi: 10.1016/j.gie.2012.11.022.
16. Gu L, Xu F, Yuan J. Comparison of AIMS65, Glasgow-Blatchford and Rockall scoring approaches in predicting the risk of in-hospital death among emergency hospitalized patients with upper gastrointestinal bleeding: a retrospective observational study in Nanjing, China. BMC Gastroenterol. 2018;18(1):98. doi: 10.1186/s12876-018-0828-5.
17. Robertson M, Majumdar A, Boyapati R, Chung W, Worland T, Terbah R, et al. Risk stratification in acute upper GI bleeding: comparison of the AIMS65 score with the Glasgow-Blatchford and Rockall scoring systems. Gastrointest Endosc. 2016;83(6):1151-60. doi: 10.1016/j.gie.2015.10.021.
18. Tang Y, Shen J, Zhang F, Zhou X, Tang Z, You T. Scoring systems used to predict mortality in patients with acute upper gastrointestinal bleeding in the ED. Am J Emerg Med. 2018;36(1):27-32. doi: 10.1016/j.ajem.2017.06.053.
19. Schacher GM, Lesbros-Pantoflickova D, Ortner MA, Wasserfallen JB, Blum AL, Dorta G. Is early endoscopy in the emergency room beneficial in patients with bleeding peptic ulcer? A "fortuitously controlled" study. Endoscopy. 2005;37(4):324–8. DOI: 10.1055/s-2004-826237
20. Chen IC, Hung MS, Chiu TF, Chen JC, Hsiao CT. Risk scoring systems to predict need for clinical intervention for patients with nonvariceal upper gastrointestinal tract bleeding. Am J Emerg Med. 2007;25(7):774–9. DOI: 10.1016/j.ajem.2006.12.024.